

## ABSTRACT

Measurement of water content in materials is needed in various fields, one of which is agriculture. Water content in top soil layer plays an essential role for success rate of agricultural. A method is needed to localization the water content in the top soil for a large area, Gravimetry is one of the method that require a lot of time and expensive to find information of water content in large area. Detection of top soil water content by remote sensing is the method of choice for mapping soil conditions over a large area. Ground Penetrating Radar (GPR) is a method that can be used in the process of Soil water Content. GPR works by transmitting electromagnetic waves into the ground and receiving reflected signals by an objects under the ground level.

This thesis proposes to imaging top soil water content information using B-Scan methods. Information the top soil water get form post-processing method proposed the Least Square extraction model, then to imaging in B-scan method for two-dimensional data processing will developed using MATLAB. The GPR system consists of a transmit antenna connected to a signal generator and receive antenna connected to the Low Noise Amplifier that connected to the signal processing unit. In this experiment, GPR system is modelled using Vector Network Analyzer.

Through processing B-Scan images will imaging of the area soil water content So that post processing using B-scan imaging on Ground Penetrating Radar will obtain information and mapping soil water content in a more efficient time. The 80 percent experiment was carried out by proving the success of previous studies in detecting top soil water content of 97 percent for scenarios with the distance between the ground and antenna R 35 mc, while for R 30 cm the accuracy in detecting top soil water content was 19.5 percent. The experimental results are not clear for the reconstruction of the B-scan signal because the device used during the experiment is unstable and soil type, setup settings in data collection due to signal transmission and the coupling between the two antennas must be prepared.

**Keywords:** *Ground Penetrating Radar, Soil of Water Content, Post-Processing, B-Scan, MATLAB.*